

period the potato bore enormous crops of berries, whilst since the prevalence of the murrain it has almost ceased flowering and fruiting; and in these facts (?) lies the whole gist of the matter. The production of fruit in profusion is regarded as an exhausting process so far as the tubers are concerned, and this is so far a very philosophic assumption, inasmuch as fruit-bearing is one of two ways to ensure the propagation of the plant. But here it becomes necessary to give the author's view respecting the "Functions of Nitrogenous Matter." It is in substance that the formation of fruit draws the nitrogenous matter from the plant and tubers, and when excessive crops of fruit are borne, the tubers are left without sufficient of this vital principle to continue the existence of the plant. On the other hand, when little or no fruit is produced, the tubers are left overcharged with this nitrogenous matter, which here becomes a source of decomposition, in proof whereof we are gravely told that the decay of manure is due to the presence of nitrogenous matter. It has long been admitted that excessive luxuriance predisposes in favour of disease; but this assumed presence of nitrogenous matter in the wrong place will hardly be accepted as an adequate explanation of the phenomena presented by the curl and the murrain. It is assumed that the potato left off bearing berries just about the time of the appearance of the murrain, and this we are told was brought about by the use of artificial manures containing a large percentage of nitrogenous matter. The "curl" was cured or rather prevented by using sets (tubers) from plants which had not been allowed to ripen seed. We have not space to examine the writer's arguments in support of this theory, but we may give his remedy.

"Having so fully set forth the natural habit of the plant, and so copiously elucidated the principles on which my theory of the disease is founded, the means of its prevention all but suggest themselves. They require compliance with but two simple forms: regenerate through the seed two or three times, and abstain as nearly as practicable, not only from nitrogenous artificial manures, such as guano, sulphate of ammonia, rape-cake, nitrate of soda, but also from strong farmyard manure."

We do not intend to attempt to refute the author in detail here, as it would occupy too much space; but we may observe that the condition of practical experience imposed upon the competitors for the Cathcart prize, of which our author complains because it disqualified him, was the wisest provision in the whole business. It is just this want of practical experience and personal knowledge that has led him astray in regard to the berry-producing power of varieties now cultivated, of the description of manure usually employed, &c. Why all varieties of the potato in all parts of the kingdom should have become just so much overcharged with nitrogenous matter at exactly the same time as to take the disease is rather puzzling. Does the writer not know that the Vine Mildew, *Oidium Tuckeri*, has been successfully combated?

Since the preceding lines were written, the report of a new (?) disease having attacked the potato-crop has caused some consternation and alarm. First we hear that it has destroyed the entire crop of American varieties in the trial gardens of the Horticultural Society at Chiswick; then the appearance of the same disease is observed in Northumberland, but here again only American varieties are affected, and a vain hope is indulged in that it may soon be stamped out. The following week, however, the horticultural journals begin to team with letters from the most distant parts, and the unwelcome truth that all varieties are alike attacked, or liable to be attacked, is forced upon us. True, we read of certain varieties being diseased, whilst others remain healthy in the same garden, but we fear there is no ground for believing that it is restricted to any particular varieties, whether of English or American origin. The Rev. M. J. Berkeley is investigating the nature of the disease, which he regards with considerable anxiety. It appears to be caused by, or perhaps succeeded by, a fungus growth. At all events a fungus is present; but we must await a thorough microscopical examination for more precise information. Mr. Shirley Hibberd, in a letter to the editor of the *Times*, takes a more hopeful view of the matter than we can; and his description of the nature and spread of the disease is not borne out by the reports from other quarters. His statement that the new disease begins in the "set" and progresses upwards, is in direct contradiction to the experience of others. In the *Gardener's Chronicle* it is affirmed that the sets of affected plants were cut in two, and in no case was there the slightest evidence of disease in the tuber causing immaturity and diseased haulm. Possibly, however, it may manifest itself in different forms.

SCIENTIFIC SERIALS

THE *Journal of the Chemical Society*, April and May.—The April number contains the following papers:—Researches on the paraffins existing in Pennsylvanian petroleum, by Thos. M. Morgan. This paper is followed by some remarks on the same subject by Prof. C. Schorlemmer.—On Groves' method of preparing chlorides, by the same.—A note on aricine, by David Howard.—On the precipitation of metals by zinc, by J. L. Davies. The author failed to precipitate to any large extent many of the metals which, according to some metallurgical books, are precipitated by zinc from acid solutions. Copper and the other well-known metals reduced by zinc precipitate well enough, but nickel, cobalt, iron, &c., do not. If, however, ammonia was added to their solutions the precipitating power of the zinc was rendered as efficient as under ordinary circumstances it is with copper, &c. The zinc was used in the shape of filings, and the author remarks that the metals precipitated by it under the above circumstances present a beautiful metallic appearance, and are in a weighable form.—On the action of the organic acids and their anhydrides on the natural alkaloids (Part III.), by G. H. Beckett and C. R. Alder Wright. The authors in this paper treat first of the action of acetic anhydride on the polymerides of codeine and morphine (dicodeine, tetracodeine, and tetramorphine being considered, further also the action of ethyl iodide on tetracodeine and octacetyl-tetracodeine); they then speak of isomeric diacetyl morphines, and of the action of ethyl iodide on acetylated morphine, codeine derivatives, and analogous products. The compounds treated of in the latter division are diacetyl-codeine ethiodide, tetracetyl-morphine ethiodide, α -, β -, and γ -diacetyl-morphine ethiodide, dibutyl-morphine ethiodide, tetrabutyl-morphine ethiodide, dibenzoyl-morphine ethiodide, tetrabenzoyl-morphine ethiodide, and a diacetyl-dibenzoyl-morphine ethiodide. Finally, there is an account of the action of ethylate of sodium on acetylated codeine and morphine.—The *Journal*, as usual, contains numerous abstracts from other serials.—The May number contains the following papers:—Further researches on bilirubin and its compounds, by Dr. J. L. W. Thudichum. This is a most elaborate paper, and we must refrain from entering on its details, confining ourselves to a mere outline of its contents. First, the author gives an account of the behaviour of bilirubin with the halogens, and in turn speaks of mono- and dibromo-bilirubin, the tri- and tetrachloro-bilirubin (with iodine there is no reaction at 80° to 100°). Then Dr. Thudichum proceeds to consider the operations made by chemists on bilirubin, prior to his own. He then describes some experiments bearing upon the alleged transformation of bilirubin into the colouring matter of urine, and treats of Maly's hydrobilirubin, urochrome spectra, and the spectra of the chemolytic products of bilirubin. We then have an account of experiments made with Jaffé's product, with which Maly compared his biliary product more particularly. Jaffé's product was obtained from febrile persons, and Dr. Thudichum points out that a source of error must here be eliminated, namely, the abnormal product uerythrin. He gives the spectrum and a new reaction of this compound; finally, there is a note on Jaffé's urobilin. The paper ends with a summary of conclusions against the alleged metamorphosis, and with some remarks on the author's theory of bilirubin and bilirubates, and on Städeler's hypothesis regarding the same.—On calcic hypochlorite from bleaching powder, by Charles T. Kingzett. This treatise turns on the chemical constitution of bleaching powder, on which subject the opinions of eminent chemists are at variance. The author describes four experiments which he made with a view to bring light into the matter, but he was not completely successful. Although his experiments may be regarded as a perfect proof of the body being in mass hypochlorite of calcium, yet he is nevertheless reluctant in being too positive on the subject, and recommends further investigation.—On a simple method of assaying iron, by Walter Noel Hartley. The principles on which this method depends are (1) The abolition of weights by exactly balancing a quantity of the ore to be examined against pure iron wire. (2) The reduction of inaccuracies in weighing by making the solutions of the iron and the ore up to the same volume, and taking a fraction (about $\frac{1}{10}$) of the liquid for experiment, whereby the error of the balance is diminished $\frac{1}{10}$. (3) The reduction of all other experimental errors to a minimum by putting comparable quantities of both ore and pure iron under precisely the same conditions. There is the usual number of abstracts in this part.

THE Geographical Magazine, July.—This is a particularly interesting number of this magazine. The first article is an abstract of the narrative of Captain the Hon. G. C. Napier, who has recently returned to India after an adventurous tour in Northern Persia. An article on "Recent Russian Explorations in Western Mongolia," accompanied by a map, gives some account of (1) Sosnovski's and Miroshnichenko's explorations on the Upper Irtysh in 1872-73; (2) Matusovski's journey into the Ektag-Altai in 1873; (3) A Russian caravan journey to Kobdo, Uliassutai, and Baikul in 1872. In an article on Paraguay the leading features of the history of that country are traced. In "A Trip up the Congo or Zaire" river, Selim Agha gives an interesting account of his journey from Fernando Po to that river in company with Capt. Burton; the latter prefaces the narrative with a few words of personal notice of his old factotum and companion. To those whose interest in Zanzibar has been awakened by the present visit of its sovereign to this country, the account of the dominions of the Seyyid Burghash, along with the good map which accompanies it, will be welcomed. The usual reviews and reports fill up the number.

Journal of Proceedings of the Winchester and Hampshire Scientific and Literary Society, vol. i. part iv., 1874.—We are glad to see from the president's address that this Society is doing much real work, and especially that it is devoting itself with considerable zest and good results to field-work. The Society includes in its programme a wide variety of subjects, and its Journal contains good papers in various departments of science. The president, the Rev. C. Collier, after reviewing the Society's work for the year, gives an interesting address on the archaeology of Winchester and its neighbourhood. Other papers in the part are "Selections from the Sanskrit Poets," by Mr. W. Waterfield; "Sarsens, greywethers, or Druid Stones," by Mr. Joseph Stevens; "Two-winged Plagues," a paper on Cestrids, Tabanids, and Hippoboscids, by the Rev. W. W. Spicer; "The Chalk Formation," by Mr. C. Griffith; and "A Gossip about Mites," by the Rev. W. W. Spicer.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, May 1.—This number contains an account of Mr. Colding's work on the behaviour and relations of atmospheric currents, consisting mainly of mathematical reasoning based upon a study of the movements of water, which he considers analogous to those of air. With regard to hurricanes, he observes that just as in a water eddy the velocity of rotation increases from the circumference towards the centre, until at the inner surface it becomes imaginary, so the velocity of the wind increases from the circumference of a revolving storm towards the centre, but at a certain distance from the centre, the boundary of the calm space, falls suddenly to stillness. He believes the following formula, which applies to water, to be good for air also, both being bounded by a resisting medium. Let water circulate in a cylinder, where H = depth of current at the circumference, V = velocity of current at the surface; then at a depth x below the surface:

$$v = V \left(1 - 0.433 \left(\frac{x}{H} \right)^{\frac{2}{3}} \right)$$

when the resistance at the base is equal to that which would be exercised by a substratum of water. If water flows in at one point in a vessel containing water, and flows out at another point, and the inflowing and outflowing quantities are equal, the surface remains at a constant level. Let the supply be in the middle and the outflow round the circumference, the water will descend towards the circumference. If the contained water be rotatory, its condition will be similar when a constant stream flows in; there will be an increase of pressure at all points, and the water will attain a higher level, descending in the directions of its escape. A whirlwind can withstand pressure from without only when the rotation has a certain velocity, and although a considerable quantity of air must flow to the whirlwind along the surface of the earth, on the other hand a permanent current must flow outwards in the direction of the surface level. In moving over the surface of the earth it encounters many obstacles, which reduce the velocity of rotation, so that an inrush of the air at higher pressure takes place, and immediately the condensed air in the lower strata forces outwards a quantity of air at the top proportionate to that which streams towards the centre below. This action of course diminishes the fury and increases the diameter of a hurricane, and exhibits the twisting motion so often observed in small whirlwinds and waterspouts. The rest of the article will be given in the next number of the *Zeitschrift*.

Der Naturforscher, May 1875.—From this part we notice the following papers:—On the atomicity of nitrogen, by Victor Meyer and M. Lecco. These gentlemen arrive at the conclusion that nitrogen is not a triad, as thought by some chemists, but a pentad.—On the process of fertilisation with fungi (Basidiomycetes) by Van Tieghem.—On the evaporation of moisture through the human skin, by Fried. Erismann.—On the cause of luminosity or non-luminosity of carboniferous flames, by F. Wibel.—On the artificial imitation of native polar-magnetic platinum, by Daubrée.—On the tenor of nitrogen in soil-acid, by E. Simon.—On the behaviour of some solutions in polarised light, by O. Hesse.—On the marine flora existing at Spitzbergen during winter, by Herr Kjellman.—On the temperatures in the southern and northern Atlantic Ocean, by Herr von Schleinitz.—On melting points, by Herr Müller.—On the dependence of the action of emulsine upon physical conditions, by Herten E. Marckurst and G. Hüfner.—On hardened glass, by Herr Bauer.—On the so-called "Riesenkessel" (gigantic kettles) near Christiania and their origin, by Herren Brögger and Reusch.—On the immunity of *Gymnotus electricus* against its own electric shock, by Herr J. Steiner.—On the influence of light on the weight of animals, by Dr. Fubini.—On the dependence of the specific heat of carbon, boron, and silicon upon temperature, by Friedrich Weber.—On the action of the central organs of the nerves, by Herr Frensborg.—On the spectrum of Encke's comet, by Herr von Konkoly.—On the action of the electric current on fused amalgama and alloys, by Eugen Obach.

Monthly Notices of Papers and Proceedings of the Royal Society of Tasmania for 1873.—This has only just come to hand, and the subject matter of some of the papers has lost in interest, inasmuch as some of the phenomena discussed—the Transit of Venus, for instance—have since taken place. Mr. F. Abbot's paper on the Transit of Venus, with special reference to the importance of determining the true distance of the sun in connection with meteorology, is a most interesting contribution. Speaking of the effects of conjunctions, he alludes to the fearful storm which took place Nov. 27, 1703, when five of the planets were in conjunction. The storm swept over the continent of Europe, causing an immense amount of damage. It was on that day the whole structure of the first Eddystone Lighthouse, together with its architect, Winstanley, and other inmates, was blown into the ocean.—The principal other contributions are on the Mersey coal-measures, by T. Stephens, M.A.; on the Tertiary Beds in and around Launceston, by R. M. Johnston; Contributions to the Phytography of Tasmania, by Baron F. Mueller; and Law of Weather and Storms, by the Right Rev. Bishop Bromby.

Reale Istituto Lombardo.—Rendiconti: vol. viii., fasc. x. and xi.—These parts contain the following papers:—On scientific association, by Prof. G. Sangali.—On the "Jaborandus," by Prof. S. Garovaglio.—On the importance of the study of meteorology to agriculturists, by Prof. Gaetano Cantoni.—On the reasons why sulphur destroys the *Oidio* (a cryptogamic parasite) of the vine, and on the emission of free hydrogen from plants, by Prof. E. Pollacci.—On two questions relating to chimneys, by Prof. R. Ferrini.—On hydrostatic pressure in relation to the molecular motion of gravitation, by Dr. G. Grassi.—The remaining papers in this part relate to political and moral sciences.

THE Journal de Physique Théorique et Appliquée, May 1875, contains the following original papers:—Researches on the modifications which light undergoes in consequence of the motion of the luminous source and of that of the observer, by M. Mascart.—On the currents of mechanical origin, by E. Bouty.—On the combustion of explosive mixtures, by M. Neyreneuf.—On the apparatus used for the explanation of the laws and formula of elementary optics, by C. M. Gariel.—On the determination of the electric capacity of bodies and of their condensing power by means of Thomson's electrometer, by M. A. Turquen.—A note by M. C. Dagenet, on the electric light in rarefied gases.

Verhandlungen des Vereins für Naturwissenschaftliche Unterhaltung zu Hamburg, 1871-74.—This is the Vereins' first publication, and contains an account of the formation and of the first year's doings of the Society, together with a copy of the laws and regulations, and a list of members. Further on we have several well-written articles, viz.:—On the preparation of caterpillars for collections, by G. J. Wittmack.—On some attempts at silk-culture with *Bombyx mori*, by Georg Semper.—Researches

on the effects of trichinæ on white rats, by C. Rodig.—On a method of preparing slugs for dry keeping in collections, by F. Hübner.—Geological recollections of a few weeks at Weymouth, by Dr. Filby.—Some remarks on *Cyprææ*, by Dr. Aug. Sutor. On the homoptera of Schleswig, by Dr. H. Benthin.—Finally, there are a number of papers relating to the fauna of the Lower Elbe, some of which are highly interesting.

THE March number of the *Bulletin de la Société d'Acclimatation de Paris* contains, among other papers, one by M. E. Rénard, on a new kind of bamboo, and the articles made from the canes of this species of plant. This particular variety is square, and is found in the Chinese provinces of Honan and Se-tchuen.—M. le Comte Pouget, in a note on the Kagou, describes a new bird known by that name in New Caledonia, of which it is a native, and called *Rhynochetos jubatus* by ornithologists. The bird is entirely insectivorous, feeding on almost every kind of insects and worms, and appears to thrive in the climate of France.—M. Gildas, a priest in the monastery of Notre Dame de la Trappe des Trois Fontaines, near Rome, gives a description of the growth of Eucalyptus trees in the Roman Campagna; the salubrity of the locality has, partly in consequence of sanitary works, and partly probably in consequence of the effect of these trees, been greatly increased of late years.—The Colorado potato beetle (*Doryphora decemlineata*) is being made the object of special research by members of the Society. M. Maurice Girard states that as this insect does not exist always in close contact with the plant on which it lives, it will probably suffer from the change of climate to which it is subjected by transportation from America to Europe, and will consequently die off. Had it been, like the Phylloxera, an insect living always closely fixed to the tree on which it preys, there would have been greater danger of its permanent introduction into other countries.

SOCIETIES AND ACADEMIES

LONDON

Anthropological Institute, June 22.—Col. A. Lane-Fox, president, in the chair.—A paper by Mr. Herbert Spencer was read on the comparative psychology of man. The author commenced by showing the necessity for division of labour in a systematic study of psychology, and proceeded to map out the subject into divisions and subdivisions, and to indicate the manner in which its various branches might be investigated. The main divisions were—mental mass and complexity, the rate of development, plasticity, variability, impulsiveness, difference of sex, the sexual sentiment, imitation, quality of thought, peculiar aptitudes, with their many subdivisions. Mental effects of mixture, and the inquiry how far the conquest of race by race has been instrumental in advancing civilisation, would also come within the scope of comparative psychology.—Mr. John Forrest read an account of the natives of Central and Western Australia, whom he had observed during two journeys he had made across the country from Western to South Australia. Among their customs might be mentioned that of tattooing on the shoulders, back, and breast, and the practice of boring noses, which is raised to the importance of a ceremony, when hundreds of individuals gather together for that object. Circumcision he found to be universal. The use of the boomerang was described, and the exaggerated statements concerning the manipulation of the weapon were corrected. Cannibalism was common among the natives of the interior. Many other descriptive details of their faith, manners, and customs were given.—A paper by Capt. John A. Lawson was read on the Papuans of New Guinea. The only part of the coast that the author examined was Houl-tree, and there, as in the interior, he met with a race of people dissimilar to those described by other travellers who have visited various parts of the coast. There was a marked diversity in stature; in the south of the island the people were shorter than those inhabiting the north. They were possessed of enormous muscular power, and showed a large thoracic development. Their complexion was a dark tawny, but not black, and their features were of Negroid type.

Royal Horticultural Society, June 2.—Scientific Committee.—J. D. Hooker, M.D., C.B., P.R.S., in the chair.—Prof. Thiselton Dyer made some further remarks on *Tetranychus Taxi*, A. Murr., which he thought did not attack the ordinary buds of the Yew, but, as far as he had observed, those containing the female flowers. The acarid appeared to feed on the nucleus of

the ovule and the adjoining scales, the external scales became brown and withered.—The Rev. M. J. Berkeley showed specimens of *Hypoxylon octraceum*, which was figured by Bulliard, tab. 444, fig. 3. It had been referred by Fries to *Lophium mytilinum*, but was really, as Sowerby was aware, the cocoon of a midge. Mr. Berkeley had met with similar cocoons belonging to other species, and Prof. Westwood was understood to be preparing descriptions of all three.—Prof. Thiselton Dyer exhibited specimens of the capsules of *Hibiscus Rosa-sinensis*, which, though the plant was so common in gardens, were quite undescribed. According to Dr. Cleghorn, it rarely if ever fruited in India. In Barbados, on the other hand, it fruited abundantly in the garden of General Munro.—Mr. Andrew Murray read a paper on the packing of living plants for transport.—Prof. Thiselton Dyer called attention to Willkomm's "Die mikroskopischen Feinde des Waldes," in which the Larch-canker was shown to be due to the attacks of the so-called "*Corticium amorphum*," since described by Hartig as *Peziza Willkommii*.

General Meeting.—W. Burnley Hume in the chair.—The Rev. M. T. Berkeley called attention to the more interesting objects exhibited. The young shoots of apple-trees were liable to great injury from an *Oidium*, which might, however, be destroyed by the use of sulphur; specimens were exhibited.

June 16.—Scientific Committee.—A. Murray, F.L.S., in the chair.—A letter was read from the Hon. Secretary of the Wiltshire Horticultural Society relating to some diseased potatoes, upon which Mr. Berkeley remarked that he had recently found the American varieties at Chiswick, especially the Early Rose, dreadfully affected with disease, communicated from the tuber to the haulm. Mr. Berkeley had hitherto been only able to make a superficial examination, but he suggested that possibly the disease in question was analogous to the "curl," a disease well known many years ago, but since then not noticed. He had found in the cells of the leaf an obscure fungoid organism—a species of *Protomyces*.—Mr. Bateman exhibited a package of the Paraguay tea, *Ilex paraguayensis*, together with the gourd and strainer used by the natives in the preparation of this tea, as figured in Hooker's *Journal of Botany* many years since.—Mr. W. G. Smith exhibited a drawing of the mould (*Ascomyces deformans*) which is associated with the Peach blister.—Dr. Masters exhibited on the part of the Rev. H. N. Ellacombe a portion of the main root of an apple nearly gnawn through by the Water Vole. Dr. Masters also showed *Cheiranthus Cheiri* var. *gynanthus*, to show that the peculiarity was reproduced from seed.—Dr. Hooker sent for exhibition the nest of a trap-door spider found in the bark of a tree at Uitenhage, Port Elizabeth, South Africa, where it was obtained by Mr. Bidwell, a member of the Legislative Assembly of Cape Town. The nest and the lid were so nearly like the bark itself that it was with difficulty the lid could be seen, and it was with some difficulty that the lid could be raised, as the insect was still within the nest. Mr. Murray suggested that the spider had taken possession of the empty cocoon of a moth (*Bombyx*), and had woven a lid to it with silk and fragments of bark.

General Meeting.—Hon. and Rev. J. T. Boscawen in the chair.—The Rev. M. J. Berkeley gave an account of the new potato disease, which he identified (as mentioned above) with that formerly known as the "curl."

PHILADELPHIA

Academy of Natural Sciences, Sept. 22, 1874.—Dr. Ruschenberger, president, in the chair.—Prof. Leidy remarked that he had found several specimens of the curious rhizopod, discovered by Cienkowski, and named by him *Clathrulina elegans*. They were found among Utricularia, but though retaining their stems, were unattached and apparently dead. One of the specimens presented a peculiar and as yet unexplained character. On one side of the latticed head the orifices were capped with little inverted hemispherical cups, from the top of which projected a funnel like the cup of the spongozoa. Prof. Leidy was pursuing his search for the living and attached *Clathrulina*.—Prof. Leeds made some remarks concerning a remarkable mineral found in a bank of white sand near Fayetteville, N.C. It was, in appearance, a rod of glass four feet in length and two inches in diameter, which was made up of a great number of irregular fragments. These fragments were highly polished on one side, the side apparently turned towards the hollow axis of the rod, and excessively contorted on the exterior side. They consisted almost entirely of siliceous, the remainder being chiefly oxide of iron. Accurate analysis showed that the percentages of the constituents in these siliceous